2015

Biology Abstracts

Annual International Conference on Biology, 22-25 June 2015, Athens, Greece

Edited by Gregory T. Papanikos

THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH

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Annual International Conference on Biology

22-25 June 2015, Athens, Greece

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TABLE OF CONTENTS

(In Alphabetical Order by Author's Family name)

Preface

This abstract book includes all the abstracts of the papers presented at the *Annual International Conference on Biology, 22-25 June 2015, Athens, Greece,* organized by the Athens Institute for Education and Research. In total there were 32 papers and 36 presenters, coming from 15 different countries (Albania, Botswana, Brazil, China, Colombia, Egypt, Iran, Jordan, Kuwait, Mexico, Romania, Russia, South Korea, UK and USA). The conference was organized into nine sessions that included areas such as Genetics, Organismic and Environmental Biology, Molecular and Developmental Biology, Morphology/Physiology and other related fields. As it is the publication policy of the Institute, the papers presented in this conference will be considered for publication in one of the books and/or journals of ATINER.

The Institute was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world could meet in Athens and exchange ideas on their research and consider the future developments of their fields of study. Our mission is to make ATHENS a place where academics and researchers from all over the world meet to discuss the developments of their discipline and present their work. To serve this purpose, conferences are organized along the lines of well established and well defined scientific disciplines. In addition, interdisciplinary conferences are also organized because they serve the mission statement of the Institute. Since 1995, ATINER has organized more than 150 international conferences and has published over 100 books. Academically, the Institute is organized into six research divisions and twenty-seven research units. Each research unit organizes at least one annual conference and undertakes various small and large research projects.

I would like to thank all the participants, the members of the organizing and academic committee and most importantly the administration staff of ATINER for putting this conference together.

Gregory T. Papanikos
President

FINAL CONFERENCE PROGRAM
Annual International Conference on Biology, 22-25 June 2015, Athens, Greece

PROGRAM

Conference Venue: **Titania Hotel, 52 Panepistimiou Avenue, Athens, Greece**

Organization and Scientific Committee

1. Dr. Gregory T. Papanikos, President, ATINER & Honorary Professor, University of Stirling, UK.
2. Dr. George Poulos, Vice-President of Research, ATINER & Emeritus Professor, University of South Africa, South Africa.
3. Dr. Anila Mesi-Dizdari, Academic Member, Atiner & Associate Professor, University of Shkodra Luigj Gurakuqi, Albania.
4. Dr. Nicholas Pappas, Vice-President of Academics, ATINER, Greece & Professor, Sam Houston University, USA.
5. Dr. Panagiotis Petratos, Vice President of ICT, ATINER, Fellow, Institution of Engineering and Technology & Professor, Department of Computer Information Systems, California State University, Stanislaus, USA.
6. Dr. Chris Sakellariou, Vice President of Financial Affairs, ATINER, Greece & Associate Professor, Nanyang Technological University, Singapore.
7. Dr. Nicolas Abatzoglou, Head, Environment Research Unit, ATINER & Professor, Department of Chemical & Biotechnological Engineering, Université de Sherbrooke, Canada, Chair Pfizer, PAT in Pharmaceutical Engineering, Director GREEN-TPV and GRTP-C & P.
8. Dr. Prakash Chand Sharma, Professor of Biotechnology and Dean, University School of Biotechnology & Director of Research and Consultancy, Guru Gobind Singh IndraprasthaUniversity, India.
9. Dr. Ibrahim. A. Hassan, Professor, Faculty of Science, Alexandria University, Egypt.
10. Dr. Glenn L. Sia Su, Associate Professor, University of the Philippines Manila, Philippines.
11. Dr. Emmanuel Mukwevho, Associate Professor, North West University, University of Johannesburg, South Africa.
12. Dr. Laurence Rahme, Associate Professor, Harvard Medical School, USA.
13. Dr. Reza Yousefi, Associate Professor of Biochemistry, Department of Biology, Shiraz University, Iran.
14. Dr. Witness Mojeremane, Associate Professor, Botswana College of Agriculture, Botswana.
15. Dr. Asma Amleh, Assistant Professor, Department of Biology, American University in Cairo, Egypt.
16. Dr. Ahmed El-Hashash, Assistant Professor, Keck School of Medicine & Herman Ostrow School of Dentistry, University of Southern California & Children's Hospital Los Angeles, USA.
17. Dr. Mechthild Nagel, Academic Member, ATINER & Professor, SUNY Cortland, USA.
18. Dr. Rouhollah Radjabi, Academic Member, ATINER & Associate Professor, Plant Protection Department, Islamic Azad University, Iran.
19. Dr. Stephen Steinberg, Academic Member, ATINER & Lecturer, University of Pensylavia, USA.

20. Dr. Kiriake Xerohemona, Academic Member, ATINER & Lecturer, Florida International University, USA.
21. Dr. Lutricia Snell, Academic Member, ATINER & Post-doctoral Fellow Research, North West University, South Africa.
22. Dr. Evangelos Spyrakos, Postdoctoral Researcher, Department of Biological and Environmental Sciences, School of Natural Sciences, University of Stirling, UK.
23. Dr. Cinzia Gravili, Researcher-Technician, Laboratory of Zoology and Marine Biology, University of Salento, Italy.
24. Ms. Olga Gkounta, Researcher, ATINER.

Administration

Stavroula Kyritsi, Konstantinos Manolidis, Katerina Maraki & Kostas Spiropoulos

Monday 22 June 2015

(all sessions include 10 minutes break)

08:30-09:00 Registration and Refreshments

09:00-09:30 (ROOM B) Welcome & Opening Remarks

- Dr. Gregory T. Papanikos, President, ATINER & Honorary Professor, University of Stirling, UK.
- Dr. George Poulos, Vice-President of Research, ATINER & Emeritus Professor, University of South Africa, South Africa.

09:30-11:30 Session I (ROOM B): Organismic and Environmental Biology I

Chair: George Poulos, Vice-President of Research, ATINER & Emeritus Professor, University of South Africa, South Africa.

1. Awatef Ali, Professor, Alexandria University, Egypt, Nawal El-Ghazaly, Alexandria University, Egypt, Samir Dekinesh, Alexandria University, Egypt, Sanaa Ahmed, Alexandria University, Egypt & Azza Sedky, Alexandria University, Egypt. Hepato-Toxicity of Gasoline as an Environmental Pollutant on Albino Mice.
2. Aaron Bunker, Assistant Professor, Morningside College, USA & Jeremy Schneider, Assistant Professor, Morningside College, USA. Once Upon a Time in a Biology Class.
3. Ermira Hoxhaj, Lecturer, Universiteti "Luigj Gurakuqi" Shkoder, Albania & Zyri Barjami, Universiteti "Luigj Gurakuqi" Shkoder, Albania. Index of Opportunity for Natural Selection for Total Koplik Population and its Surroundings and also for its Autochthonous Tribes.
4. *J. Reid Schwebach, Coordinator, Accelerator Program and Biology Department, George Mason University, USA. Advancing Graduate Education and Faculty Development with Discipline Based Education Research and the SIMPLE Framework: Creation and Implementation of Innovative and Engaging Teaching Strategies in a Biology Department.
5. Kwang Jin Kim, Senior Researcher, National Institute of Horticultural and Herbal Science, Korea, Md. Khalekuzzaman, National Institute of Horticultural and Herbal Science, Korea, Eun Ha Yoo, National Institute of Horticultural and Herbal Science, Korea, Hyeon Ju Kim, National Institute of Horticultural and Herbal Science, Korea, Hyun Hwan Jung, National Institute of Horticultural and Herbal Science, Korea & Hye Sook Jang, National Institute of Horticultural and Herbal Science, Korea. Phytoremediation of VOCs: Improvement of Indoor Air Quality by Potted Plants.

11:30-13:30 Session II (ROOM B): Genetics, Molecular and Developmental Biology I

Chair: *J. Reid Schwebach, Coordinator, Accelerator Program and Biology Department, George Mason University, USA.

1. Soad Hamed, Associate Professor, Helwan University, Egypt, Hatem A. El-mezayen, Helwan University, Egypt, Mohamed Mohei, Cairo University, Egypt & Mahmoud Abdelrahman, Helwan University, Egypt. Clinical Utility of Interleukin 17 in the Assessment of Hepatic Fibrosis in Schistosoma/hepatitis C Coinfected Patients: Its Role in Extracellular Remodeling.
2. *Katerina Lazidou, Ph.D. Student, University of Reading, U.K., D. Charalampopoulos, University of Reading, U.K. & K. Watson, University of Reading, U.K. Optimizing Enzyme Behaviour through Protein Engineering.
3. Tatyana Zykova (Vatolina), Research Worker, Institute of Molecular and Cellular Biology of the Siberian Branch of the Russian Academy of Sciences, Russia, Darya Demidova, Research worker, Student, Victor Levitsky, Research Worker, Varvara Khoroshko, Research Worker, Elena Belyaeva, Main Research Worker & Igor Zhimulev, Main Research Worker, Institute of Molecular and Cellular Biology of the Siberian Branch of the Russian Academy of Sciences, Russia. Molecular and Genetic Structure of Polytene Chromosome Banding Pattern in *Drosophila Melanogaster*.
4. Mai Abdul Rahman, Graduate Student, The American University in Cairo & Asma Amleh, Assistant Professor, The American University in Cairo, Egypt. Mouse Testis-derived Mesenchymal Stromal Cells: Isolation, Propagation and Characterization.
5. Heba Shawer, Graduate Student, American University in Cairo, Egypt, Aya El Serw, Undergraduate Student, American University in Cairo, Egypt, Basel Refky, Assistant Lecturer, Mansoura Oncology Center, Egypt & Asma Amleh, Assistant Professor, American University in Cairo, Egypt. The Expression Pattern of Mirna-590-3P In Epithelial Ovarian Cancer is a Potential Biomarker for Ovarian Cancer Patients.

13:30-14:30 Lunch

14:30-16:30 Session III (ROOM B): Morphology – Physiology I

Chair: *Ludmil Benov, Professor, Kuwait University, Kuwait.

1. Nadezhda Goncharova, Head, Research Institute of Medical Primatology, Russia & Olga Chigarova, Graduate Student, Research Institute of Medical Primatology, Russia. Individual and Age-Related Differences of Stress Responsiveness of the Hypothalamic-Pituitary-Adrenal Axis and its Vasopressinergic Regulation in Monkeys.
2. Mahmoud Al-Shawabkeh, Assistant Professor, Applied Sciences University, Jordan. Evaluation of Novel Compound Benzoylphenyl -Indole-Carboxamide Effect on Hyperlipidemic and Hyperglycemic Rat.
3. Anila Mesi (Dizdari), Associate Professor, University of Shkodra "Luigj Gurakuqi", Albania & Ditika Kopliku, Associate Professor, University of Shkodra "Luigj Gurakuqi", Albania. Physiological Feedback and Tolerance of *Vicia Faba* L. to Cadmium and Zinc and Their Interactions.

16:30-18:30 Session IV (ROOM B): Special Topics in Biology

Chair: Nadezhda Goncharova, Head, Research Institute of Medical Primatology, Russia.

1. *Ludmil Benov, Professor, Kuwait University, Kuwait. Metalloporphyrins and the Fight against Drug-Resistant Pathogens.
2. *Lijuan Qiu, Vice Dean, Institute of Crop Science, Chinese Academy of Agricultural Sciences, China, Ying-hui Li, Chinese Academy of Agricultural Sciences, China, Jianxin Ma, Purdue University, USA, Guangyu Zhou, Novogene Bioinformatics Institute, China, Scott Jackson, University of Georgia, USA & Ruiqiang Li, Novogene Bioinformatics Institute, China. Genomic Diversity and Domestication of Soybean.
3. Wen-Li Chen, Professor, Huazhong Agricultural University, China, Ju-Yuan Zhang, Postdoc, Huazhong Agricultural University, China, Xue-Mei Deng, Master Student, Huazhong Agricultural University, China, Feng-Pu Li, Master Student, Huazhong Agricultural University, China, Li Wang, Associate Professor, Huazhong Agricultural University, China, Qiao-Yun Huang, Professor, Huazhong Agricultural University, China & Cheng-Cai, Professor, Aix-Marseille Université and CNRS, Laboratoire de Chimie Bactérienne - UMR7283, France. RNase E Forms a Complex with Polynucleotide Phosphorylase in Cyanobacteria via a Cyanobacterial-Specific Nonapeptide in the Noncatalytic Region.

18:30-20:30 Session V (ROOM C): A Round-Table Discussion on The Future of Technology and Engineering Education

Chair: Dr Lampros Pyrgiotis, Independent Researcher; President, Greek Society of Regional Scientists, Greece.

1. Dr Jong-Rong Chen, Professor, National Central University, Taiwan.
2. Dr Don Clucas, Senior Lecturer, University of Canterbury, New Zealand.
3. Dr Patrick van der Duin, Assistant Professor, Delft University of Technology, the Netherlands.
4. Dr Konstadinos Goulias, Professor, University of California Santa Barbara, USA.
5. Dr Till Haenisch, Professor, BW State University, Germany.
6. Dr Theo van Niekerk, Professor, Nelson Mandela Metropolitan University, South Africa.
7. Dr Theodore Trafalis, Head, Industrial Research Unit, ATINER & Professor of Industrial and Systems Engineering, The University of Oklahoma, USA.
8. Dr Themistoklis Xanthopoulos, Professor Emeritus & former Rector, National Technical University of Athens (NTUA), Greece.
9. Dr Jin Zhouying, Director, Chinese Academy of Social Sciences, China.

21:00-23:00 Greek Night and Dinner (Details during registration)

Tuesday 23 June 2015

09:00-11:00 Session VI (ROOM B): Organismic and Environmental Biology II

Chair: Christopher Janetopoulos, Associate Professor, University of the Sciences, USA.

1. Joan Gaston Zamora-Abrego, Professor, Universidad Nacional de Colombia, Colombia & Angela Maria Ortega-Leon, Professor, Universidad de Cordoba, Colombia. Current Conservation Status of the American Crocodile, *Crocodylus acutus* (Cuvier, 1807), in the National Natural Park Paramillo, at Córdoba-Colombia.
2. Jonathan Holz, Assistant Professor, D'Youville College, USA, Eric Beier & J. Edward Puzas, D'Youville College, USA. Effects of Lead Deposition on the Musculoskeletal System.
3. *Mohammadjavad Seghatoleslami, Associate Professor, Islamic Azad University, Birjand Branch, Iran & Omid Ashrafi, Former M.Sc. Student, Islamic Azad University, Birjand Branch, Iran. Intercropping of Two Medicinal Plants (Ajowan and Cumin), an Approach to Sustainable Agriculture.
4. *Hassan Feizi, Assistant Professor, University of Torbat-e-Heydarieh, Iran, Hossein Sahabi, PhD Student, University of Torbat-e-Heydarieh, Iran & Abdollah Mollafilabi, PhD, Research institute of Food Science and Technology, Mashhad, Iran, Response of Saffron *(Crocus sativus L.)* to Summer Irrigation and Conservation Tillage in Iran.
5. Ditika Kopliku, Associate Professor, University of Shkodra "Luigj Gurakuqi", Albania & Anila Mesi (Dizdari), Associate Professor, University of Shkodra "Luigj Gurakuqi", Albania. Potential Mutagenic Activity of Leachate from a Municipal Solid Waste Landfill on Two Higher Plants.
6. Hossein Sahabi, PhD Student, University of Torbat-e-Heydarieh, Iran, Hassan Feizi, Assistant Professor, University of Torbat-e-Heydarieh, Iran & Alireza Karbasi, Associate Professor, Department of Agricultural Economy, Ferdowsi University of Mashhad, Iran. Agronomic and Economic Evaluation of Saffron and Wheat Crop Production Systems in Torbat-e-heydarieh, Iran

11:00-12:30 Session VII (ROOM B): Morphology – Physiology II

Chair: *Mohammadjavad Seghatoleslami, Associate Professor, Islamic Azad University, Birjand Branch, Iran

1. *Witness Mojeremane, Associate Professor, Botswana College of Agriculture, Botswana, Thembinkosi Mathowa, Technician, Botswana College of Agriculture, Botswana, Patrick Jane, Undergraduate Student, Botswana College of Agriculture, Botswana, Christopher Mpofu, Junior Researcher, Botswana College of Agriculture, Botswana & Gabatshele Mbona Legwaila, Senior Lecturer, Botswana College of Agriculture, Botswana. Germination and Seedling Emergence Studies in Nyala Tree (Xanthocercis Zambesiaca Baker).
2. Carmen Liliana Badarau, Researcher and Lecturer, National Institute of Research and Development for Potato and Sugar Beet Brasov and Transilvania University of Brasov, Romania, Florentina Damsa, Researcher, National Institute of Research and Development for Potato and Sugar Beet Brasov, Romania, Nistor Andreea & Chiru Nicoleta, National Institute of Research and Development for Potato and Sugar Beet Brasov, Romania. Effects of Some Electrotherapy Treatments of Pvx and Pvy Infected Potato Plantlets Cv. Roclas, on the Chlorophyll and Anthocyanin Content of Regenerated Plants.
3. Seyyed Gholamreza Moosavi, Associate Professor, Islamic Azad University,

Birjand Branch, Iran, Saeed Ghanbari, Former Master Student, Islamic Azad University, Birjand Branch, Iran & Hamid Reza Zabihi, Assistant Professor, Islamic Azad University, Birjand Branch, Iran. The Effect of Plant Growth Promoting Rhizobacteria (PGPR) and Zinc Fertilizer on the Yield and Agronomic Traits of Maize under Water Deficit Stress Condition.

12:30-14:00 Session VIII (ROOM B): Genetics, Molecular and Developmental Biology II

Chair: Alejandra Soto-Estrada, Senior Research Professor, Colegio de Postgraduados, Campus Veracruz, Mexico.

1. Christopher Janetopoulos, Associate Professor, University of the Sciences, USA. The Spatial and Temporal Regulation of PI(4,5)P2 Is Critical for Symmetry Breaking in Cell Division and Migration.
2. Maliheh Entezari, Assistant Professor, Department of Genetics, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran & Shida Kazemi, Student, Department of Medicine, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran. Anticancer Effects of Triterpenoid Extracted from *Glycyrrhiza Glabra* Root on Human Breast Cancer Cell Line
3. Mehrdad Hashemi, Associate Professor, Department of Genetics, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran & Shaghayegh Karimi, Student, Department of Genetics, Tehran Medical Sciences Branch , Islamic Azad University, Tehran, Iran. Apoptotic Effects of Glycyrrhetinic Acid in Human Lung Carcinoma.

14:00-15:00 Lunch

15:00-16:30 Session IX (ROOM B): Morphology – Physiology III

Chair: Mahmoud Al-Shawabkeh, Assistant Professor, Applied Sciences University, Jordan.

1. Lan Jiang, Assistant Professor, Oakland University, USA. Drosophila *Expansion* Gene Controls Trachea Tube Size.
2. Alejandra Soto-Estrada, Senior Research Professor, Colegio de Postgraduados, Campus Veracruz, Mexico & Catarino Avila-Resendiz, Associate Research Professor, Colegio de Postgraduados, Campus Veracruz, Mexico. Floral Biology of Female and Hermaphrodite Plants from Mexican Native Papaya.
3. *Reza Yousefi, Associate Professor, Shiraz University, Iran. The Pleiotropic Preventive Effects of Curcumin in Diabetes Mellitus; The Insights into Attenuation of Postprandial Hyperglycemia and Downstream Molecular Events.
4. Caroline Berardi Chaibub, Student, Unifenas, Brazil, Maria Lucia, Unifenas, Brazil, Evelise Aline Soares, Unifenas, Brazil, Paul Cesar Garcia Naves, Unifenas, Brazil & Jose Antonio Dias Garcia, Unifenas, Brazil. Influence of Urutu (Bothrops Alternatus) Venom in the Lipid Profile in Dyslipidemic Rats.

16:30-19:00 Urban Walk (Details during registration)

20:30- 22:00 Dinner (Details during registration)

Wednesday 24 June 2015
Cruise: (Details during registration)

Thursday 25 June 2015
Delphi Visit: (Details during registration)

Mai Abdul Rahman
Graduate Student, The American University in Cairo
&
Asma Amleh
Assistant Professor, The American University in Cairo, Egypt

Mouse Testis-derived Mesenchymal Stromal Cells: Isolation, Propagation and Characterization

Objective: Mesenchymal Stromal/Stem Cells (MSCs) isolated from different tissues are promising tools for regenerative medicine. However, the rarity of these populations is considered a limiting factor in their therapeutic potential. Although few studies have reported the isolation MSCs from the testis, there is no report on their isolation from the mouse despite its close genetic similarity to humans. The objective of the present study is to utilize the mouse model for the isolation and characterization of testis-derived Mesenchymal Stromal Cells (tMSCs).

Methods and Results: We employed a new method to enrich for MSCs from testicular cell populations using positive selection on laminin-coated dishes. The isolated cell fraction was plastic adherent and had been successfully propagated *in vitro*. Reverse Transcription-Polymerase Chain Reaction (RT-PCR) and immunophenotyping using Fluorescence-Activated Cell Sorter (FACS) demonstrated that tMSCs were positive for mesenchymal stem cell markers; CD29, CD44, CD73 and CD90 but negative for the hematopoietic cell marker CD45. The lack of expression of the germ cell marker VASA confirmed that tMSCs are not of germ cell origin.

Conclusion: To our knowledge, this is the first study to report the isolation of Mesenchymal Stromal Cells from the mouse testis. Based on our findings, tMSCs possess characteristics and marker profiles similar to that of MSCs, which makes them a potential valuable tool in cell therapy.

Mahmoud Al-Shawabkeh
Assistant Professor, Applied Sciences University, Jordan

Evaluation of Novel Compound Benzoylphenyl -Indole-Carboxamide Effect on Hyperlipidemic and Hyperglycemic Rat

Hyperlipidemia is one of the most risk factors involved in the development of cardiovascular disease. As a consequence of hyperlipidemia treatment, high demand for new oral antihyperlipidemic drugs is required. The present study was designed to investigate the potential effect of a novel compound N-[4-benzoylphenyl]-1*H*-indole-2-carboxamide on diet-induced hyperlipidemic (prepared by mixing cholesterol 0.5%, ¼ % cholic acid, 20% fat and 2% corn oil with standard powdered animal food for two months) , triton-induced hyperlipidemic (by intraperitoneal injection of Triton WR-1339 250 mg/kg body weight) and alloxan-induced hyperglycemic rats (150 mg/kg body weight injected intraperitoneally). Lipid profiles [Total cholesterol (TC), Triglyceride (TG), Low density lipoprotein (LDL) and high density lipoprotein (HDL)] in all groups showed significant ($p<0.05$) increase before treatment. After 24 hrs of treatment with N-[4-benzoylphenyl]-1*H*-indole-2-carboxamide (15mg/kg body weight), significant decrease ($p<0.05$) in serum cholesterol level 60%, , triglyceride 33-45%, LDL 32% and increase HDL 58% levels. Nevertheless, antihyperlipidemic Fenofibrate - used as standard reference - showed parallel results of the target compound. On the other hand, the target compound showed no significant effect on glucose level of hyperglycemic rats. The results indicate that N-[4-benzoylphenyl]-1H-indole-2-carboxamide possesses significant anti hyperlipidemic activity and having a promising potential in the treatment of hyperlipidemia correlated to heart diseases.

Awatef Ali
Professor, Alexandria University, Egypt
Nawal El-Ghazaly
Alexandria University, Egypt
Samir Dekinesh
Alexandria University, Egypt
Sanaa Ahmed
Alexandria University, Egypt
&
Azza Sedky
Alexandria University, Egypt

Hepato-Toxicity of Gasoline as an Environmental Pollutant on Albino Mice

In this study, two kinds of motor gasoline (vehicle fuel in Egypt), gasoline 90 and gasoline 80 will be used to find out if the hazards produced by gasoline 90 are less than those produced by gasoline 80 in healthy Swiss albino mice.

Sixty mice were equally divided into 3 groups: group one (control), group two (topically treated with 0.5ml gasoline 90 /kg B.W.) and group three (topically treated with 0.5ml gasoline 80 /kg B.W.). Specimens were taken after 4 and 8 weeks.

Determination of bioaccumulation of some heavy metals, physiological examination and light microscopical study were performed.

It was found that the accumulation of lead, cadmium and nickel in the liver has the following order lead > cadmium > nickel.

After topically treated with gasoline 90 and 80 for 8 weeks physiological examination showed increase in activities of serum liver functions enzymes (alkaline phosphatase, alanine aminotransferase and aspartate amino transferase), increase in the activity of adenosine deaminase and decrease in total protein content in liver homogenate.

The light microscopical examinations showed pathological changes which were more pronounced by treatment with gasoline 80 than gasoline 90 depending upon treatment duration from 4 to 8 weeks. After 4 weeks of topically treated mice with gasoline 90, cellular infiltration, dilatation of blood sinusoid and cytoplasmic vaculation were demonstrated. After 8 weeks, liver sections showed disrupted liver architecture with liquid infiltration and presence of foamy areas. After 4 weeks of topically treated mice with gasoline 80, there were shrinked blood sinusoid ,hypatocyte vaculation with pyknotic nuclei and different stages of karyolysis . After 8 weeks, liver sections showed

noticeable hypatocyte degeneration and complete disappearance of blood sinusoids.

Carmen Liliana Badarau
Researcher and Lecturer, National Institute of Research and Development for Potato and Sugar Beet Brasov and Transilvania University of Brasov, Romania
Florentina Damsa
Researcher, National Institute of Research and Development for Potato and Sugar Beet Brasov, Romania
Nistor Andreea
National Institute of Research and Development for Potato and Sugar Beet Brasov, Romania
&
Chiru Nicoleta
National Institute of Research and Development for Potato and Sugar Beet Brasov, Romania

Effects of Some Electrotherapy Treatments of Pvx and Pvy Infected Potato Plantlets Cv. Roclas, on the Chlorophyll and Anthocyanin Content of Regenerated Plants

The purpose of this study was to estimate several biological effects of some treatments (electrotherapy in tissue culture) used for decrease PVX (potato virus X) and PVY (potato virus Y) infection level. The biological material used in experiments was plants (variety Roclas, virus free biological material) mechanically inoculated using PVX secondary infected plants from Bintje variety and PVY secondary infected plants from Record variety. Electrotherapy was applied in 9 variants: after washing and sizing explants, potato stems infected were exposed to either 40, 50 or 100 miliamper, for 5, 10 or 20 minutes, followed by sterilization and planting the axillary buds tip in vitro. Biological material selected for monitoring healthy potato plants was represented by regenerated plants on variants 7, 8 and 9. Physiological indicators were determined after 42 days of vegetation (PVX infected material) and after 36 vegetation days for the other plants. Monitoring the vegetative state of healthy regenerated plant was done by estimation the chlorophyll content of leaf (portable device SPAD 502 Chlorophyll Meter) and the anthocyanin content at leaf (portable device ACM 200 plus, Antocianin Chlorophyll Meter).Within the elimination of viruses PVY and PVX by electrotherapy was noticed a significant decrease of chlorophyll content compared to the control in case of variant V9 (100mA/20minutes). Regarding the content of anthocyanin, there were significant differences between values recorded in the experimental variants as was checked using simple correlation coefficient Pearson. Compared to the negative control, however, it was found small increase of anthocyanin content in case of material initially

infected with PVY (but the values were not statistically supported). As opposed the content of anthocyanin, we remark that monitoring of chlorophyll content indicate some changes in plant physiology, being observed effects of electrotherapy treatments over the biological material regenerated from plantlets infected with PVX and PVY and treated.

This work was supported by a grant of the Romanian National Authority for Scientific Research, CNDI-UEFISCDI, project number 178/2014.

Ludmil Benov
Professor, Kuwait University, Kuwait

Metalloporphyrins and the Fight against Drug-Resistant Pathogens

The persistent problem of drug resistance, which can lead to an end of the antibiotic era, creates a strong demand for new methods for therapy and disinfection. Mimicking molecules that are indispensable for the life of pathogenic organisms but lack natural activity, is a promising way for developing antibiotic substitutes. Among such potentially useful molecules is heme. Even though most microorganisms are able to synthesize heme, its uptake from the host is essential for successful invasion by bacterial pathogens. Heme can be relatively easily modified by replacing the iron in the center of the porphyrin and by attaching various substituents at the periphery of the tetrapyrrole ring. Substitution of the heme iron with redox-inactive metals (Zn, In) produces photo-active compounds, photosensitizers, which upon activation with visible light, efficiently kill microbial pathogens. Introduction of a redox-active metal in the porphyrin ring produces analogs that exert antimicrobial action by redox-cycling. By occupying the place of heme in various protein complexes, making them inactive, modified metalloporphyrins can suppress metabolism and other vital microbial functions. Modulation of metalloporphyrin uptake by modifications at the periphery of the ring, which affect lipophilicity, tri-dimensional shape, size, bulkiness, and flexibility of the molecule, improves selectivity and limits damage to host tissues. Among the main advantages of metalloporphyrin-based antibacterials is low toxicity to the host, and inability of microbes to develop resistance. Use of metalloporphyrin-based antimicrobials can prolong the life of classical antibiotics by limiting unnecessary antibiotic exposure, thus preventing development of drug resistance.

Caroline Berardi Chaibub
Student, Unifenas, Brazil
Maria Lucia
Unifenas, Brazil
Evelise Aline Soares
Unifenas, Brazil
Paul Cesar Garcia Naves
Unifenas, Brazil
&
Jose Antonio Dias Garcia
Unifenas, Brazil

Influence of Urutu (Bothrops Alternatus) Venom in the Lipid Profile in Dyslipidemic Rats

Introduction: Studies on substances such as toxins that regulate the lipidic metabolism are an important target for the development of new therapeutic agents with the intention of diminishing the risk of cardiovascular diseases. **Objectives:** The aim of this study is to verify the effect of the urutu (Bothrops alternatus) venom on the lipidic profile in LDLr-/- rats. **Materials and Methods:** 3-month-old male LDLr-/- rats, divided in 4 groups (n=10): (S) - received a standard feed for rodents (Nuvital®) for 2 weeks; (SU) **-** received a standard feed for rodents (Nuvital®) and a treatment with DL50 80% doses of the venom in a 0,5 mL volume via IP for two weeks; (HL) - received a hyper-lipidic feed containing 20% of total fat, 1,25% of cholesterol and 0,5% of cholic acid for 2 weeks; (HLU) received a hyper-lipidic feed containing 20% of total fat, 1,25% of cholesterol and 0,5% of cholic acid and a treatment with DL50 80% doses of the venom in a 0,5 mL volume via IP for two weeks. Two weeks later total cholesterol serum levels (CT) were determined together with their fractions (LDL_c and HDL_c) and triglycerides (TG). DL50 was determined by the Reed-Muench method. The experimental protocol was approved by CEUA-UNIFENAS evaluation number 21A-2013. **Results:** The urutu venom showed an anti-dyslipidemic effect preventing the CT increase in the SU and HLU groups when compared with that ones of the S and HL groups, respectively (113±6; 151±12; 257±5 and 869±15 mg/dL); furthermore, it also prevented the increase of triglyceride levels, respectively (124±19; 60±9; 165±10 and 266±37 mg/dL). Moreover, it increased the HDL_c plasmatic level of the HLU group in comparison with the HL group, respectively (74±5 and 20±1mg/dL). **Conclusion:** The total urutu venom in this experimental protocol showed a beneficial effect for the prevention of the genetic and genetically associated to alimentary dyslipidemias.

Aaron Bunker
Assistant Professor, Morningside College, USA
&
Jeremy Schneider
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Once Upon a Time in a Biology Class

Leading scientific organizations, like the American Association for the Advancement of Science, have called for innovative approaches to student learning, particularly in regard to "real-world examples." In response to this call, a liberal arts physiology course employed writing in a different way. The traditional disciplinary genres (lab reports, essays, etc.) are used along with alternative styles that encourage students to approach the content in a creative manner. Drawing on longstanding writing-to-learn theory, innovative writing projects can be used when they build upon writing skills acquired from other disciplines and use creative writing in order to improve content comprehension. A carefully designed creative writing assignment not only enlivens the classroom, it also serves as a powerful way to encourage meaningful connections with content, a deeper understanding of concepts, and the ability to discuss disciplinary concepts with a non-disciplinary audience. In this paper, we illustrate the place that creative narratives can hold in both the classroom and in sound pedagogical practices. This paper draws on the use of narrative writing in a college-level, human physiology course to show the benefits of alternative types of writing assignments in biology courses. The paper provides the creative narrative assignment learning objectives, assignment details, rubrics, and examples of student work to illustrate the role this type of writing played in expanding their content comprehension. This paper also demonstrates how to transform a conventional physiology writing project into an innovative multidisciplinary writing across the curriculum (WAC) project. Specific student writing examples are provided in the paper to show how the students interacted with the course content in a playful way as they drew from writing skills learned in other classes. The paper also provides descriptions of the writing project, learning objectives, and summarizes course evaluation and student comment feedback regarding the WAC project.

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RNase E Forms a Complex with Polynucleotide Phosphorylase in Cyanobacteria via a Cyanobacterial-Specific Nonapeptide in the Noncatalytic Region

In eukaryotes such as mammals and plants, many mRNAs species are relatively stable, with half-lives of more than several hours. In contrast the average half life of bacterial mRNA lasts only about a few minutes, reflecting rapid responses of bacterial cells to constantly changing environments. The degradation of bacterial mRNA is a highly dynamic and tightly regulated process, involving many RNA processing enzymes and assisting proteins. RNase E, a central component involved in bacterial RNA metabolism, usually has a highly conserved N-terminal catalytic domain but an extremely divergent C-terminal domain. While the C-terminal domain of RNase E in *E. coli* recruits other components to form an RNA degradation complex, it is unknown if similar function can be found for RNase E in other organisms due to the divergent feature of this domain. Here, we provide evidence showing that RNase E forms a complex with another essential ribonuclease – the polynucleotide phosphorylase (PNPase), in cyanobacteria, a group of ecologically important and phylogenetically ancient organisms. Sequence alignment for all cyanobacterial RNase E proteins revealed several conserved and variable sub-regions in their non-catalytic domains. One such sub-region, an extremely conserved nonapeptide (RRRRRRSSA) located near the very end of RNase E, serves as the PNPase recognition site in both the filamentous cyanobacterium *Anabaena* PCC7120 and the unicellular cyanobacterium *Synechocystis* PCC6803. These results indicate that RNase E and PNPase

form a ribonuclease complex via a common mechanism in cyanobacteria. The PNPase-recognition motif in cyanobacterial RNase E is distinct from those previously identified in Proteobacteria, implying a mechanism of co-evolution for PNPase and RNase E within the RNA degradation complexes in different organisms.

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Anticancer Effects of Triterpenoid Extracted from *Glycyrrhiza Glabra* Root on Human Breast Cancer Cell Line

Todays cancer is one of the main reason of mortality in the world which appears by the effect of enviromental physico-chemical mutagen and carcinogen agents. A number of natural antitumor drugs exert their therapeutic effect by inducing or promoting apoptosis. Glycyrrhizin is the chief sweet-tasting constituent of *Glycyrrhiza glabra* root.

Aim: This study was performed to determine the anti-cancer effect of Glycyrrhizin on MCF7 cells in breast cancer.

Methods and materials: In this study human breast cancer cell line were cultured in DMEM [Sigma], supplemented with 10% fetal bovine serum (FBS), penicillin -streptomycin and L-glutamine. The cultures were incubated at 37ºC, 5% CO_2 and then inhibitory effect of Glycyrrhizin on their proliferation was measured by MTT assay.

Results: During MTT, human breast cancer cell line revealed to have a meaningful cell death when compared with controls.

Conclusions: Totally, according to the obtained results and comparison with other studies, it may be concluded that Glycyrrhizin has good anti-cancerous effects on MCF7 cells in breast cancer.

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Response of Saffron *(Crocus sativus L.)* to Summer Irrigation and Conservation Tillage in Iran

Effects of summer irrigation and conservation tillage on flower characteristics and corms behavior of Saffron (Crocus sativus L.) was studied. A field experiment was conducted at Faculty of Agriculture, University of Torbat-e-Heydarieh, Iran during 2009- 2010. A factorial trial based on complete randomized block design with four replications was used. The experimental treatments were different combinations of summer irrigation (July, August, July + August and no irrigation) and conservation tillage (application and non- application). Based on analysis of variance, in the first and second years, summer irrigation had significant effects on number and flower yield of saffron. In the first year, the highest number of flower, flower and stigma yield of saffron significantly observed by irrigation on July + August (25 flowers. m-2, 12.1 and 0.16 g.m-2), respectively. In the second year, irrigation in August had highest significant effects on mentioned characteristics of saffron (127.4 flowers. m-2, 61.4 and 0.87 g.m-2), respectively. In the first year, flower and stigma yields of saffron significantly increased by conservation tillage (by 11.3 and 11.7%), as compared to control (no conservation tillage). In addition, summer irrigation and conservation tillage significantly increased picrocrocin content.

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Individual and Age-Related Differences of Stress Responsiveness of the Hypothalamic-Pituitary-Adrenal Axis and its Vasopressinergic Regulation in Monkeys

Stress adaptation is fundamental for health, and the hypothalamic-pituitary-adrenal axis (HPA) is one of its main mechanisms. Considerable data indicate that arginine vasopressin (AVP) related disturbances of stress adaptation can occur with aging. Most such studies, however, have been performed on rodents and failed to consider individual characteristics of the animals. The purpose of this study was to investigate individual and age-related differences of HPA responsiveness to acute stress and its vasopressinergic regulation in monkeys that differ in their behavioral responses to stress. Rhesus monkeys, young adult and old females with healthy adaptive behavior (SB) and depression-like and anxiety-like behavior (DAB) were evaluated for responsiveness of HPA for three tests: restraint, insulin-induced hypoglycemia, and AVP treatment. In addition, old animals were subjected to the insulin test a second time, 60 min after treatment with a V1b receptor antagonist or placebo. Young monkeys demonstrated absence intergroup differences in plasma levels of АКТГ and corticosteroids in response to restraint stress and to insulin-induced hypoglycemia. In the same time, old animals with DAB responded with higher plasma levels of ACTH and AVP, lower levels of corticosteroids and higher cortisol/DHEAS molar ratios to the stress exposure compared to old animals with SB. AVP and ACTH dynamics were closely correlated in most animals. AVP treatment in old monkeys produced differences in ACTH and corticosteroid responses similar to those produced by the stressors but AVP treatment in young animals revealed higher rise of ACTH level in animals with DAB compared to animals with SB. ACTH response to hypoglycemia in old animals was dramatically reduced by prior administration of the antagonist in comparison with placebo controlled old animals. These results suggest that the dysfunctions of HPA observed in animals with DAB are caused by increased tone of the vasopressinergic system in regulation of HPA stress reactivity.

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Clinical Utility of Interleukin 17 in the Assessment of Hepatic Fibrosis in Schistosoma/hepatitis C Coinfected Patients: Its Role in Extracellular Remolding

Background/Aims: Interleukin (IL)-17 is considered a pro-inflammatory cytokine which play a key role in the pathogenesis of liver diseases.In the current study we examined the role of IL-17 signaling in the liver fibrosis and its role on extracellular remodeling. We also developed a novel score based on IL-17, hyaluronic acid, its degradation enzyme, degrading product and transaminases for assessment of liver fibrosis in ***Schistosoma*** /HCV co-infected patients.

Materials & Methods: Plasma levels of IL-17 and Hyaluronic acid were assessed by ELISA technique while N-acetyl-β-D-glucosaminidase, β-glucuronidase, aspartate transaminase (AST), and alanine transaminase (ALT) were assayed by standard colorimetric methods in 100 individuals with ***Schistosoma*** /HCV co-infection. Statistical analysis was carried out by logistic regression and receiver-operating characteristic curves.

Results: Our results revealed that the best linear combination of only significant blood markers was used for the determination of the fibrosis discriminant score is; [2.1 (numerical constant) + 0.12 × IL-17 (pg/ml) + 0.012 × Hyaluronic acid (pg/l) + 2.16 × β-glucuronidase (mol/ml/min) + 0.05 × N-acetyl-β-D-glucosaminidase (g/dl) + 0.89 × AST/ALT]. The selected fibrosis discriminant score function correctly classified 82% of patients with severe liver fibrosis at a discriminant cut-off score= 0.55 (i.e. less than 0.55 indicated mild liver fibrosis and greater than 0.55 indicated severe liver fibrosis), with a sensitivity of 88% and a specificity of 79%. **Conclusion:** A simple fibrosis index can be useful to select ***Schistosoma***/HCV co-infected patients with a very low risk of significant fibrosis in whom the protocol of liver biopsies may be avoided.

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Apoptotic Effects of Glycyrrhetinic Acid in Human Lung Carcinoma

Experience over several years has indicated that chemotherapy, even if widely used, does not always remain effective in the therapy of lung tumors and in addition is linked to serious side effect. GHA is the active compound in Glycyrrhizae radix, afomus traditional chinese medicine.Recently the anticancer activity of GHA became the focus of scientific interest.

Aim: We investigated the ability of GHA to produce lethal effect in human lung carcinoma (A549) and Human fetal lung fibroblast (MRC_5) cell lines.

Matherial and Methods: In this study human lung carcinoma (A549) and Human fetal lung fibroblast (MRC_5) cell lines were cultured in DMEM_HglC [sigma], supplemented with 10% fetal bovine serum (FBS)[gibco], penecilin-streptomycin and L-glutmain. The cultured were incubated at 37 °C, 5% CO2 and then inhibitory effect of GHA on their proliferation was measured by MTT assay. Apoptosis monitored by Annexin_v staining using flow cytometry and hoecsht staining methods

Result: The cytotoxicity results evaluated by MTT assay, revealed that the IC50 for GHA after 48h of incubation with A549 cells was apporoximately 100_125 mg/L. The Annexin_V staining using flow cytometry analysis indicated apoptotic cells confluency in treated A549 cell lines by 100mg/L of GHA compared to live cells conflency without treated GHA. Hoecsht staining also revealed significant cell death in A549 cell lines.

Conclusion: The result demonstrated that GHA inhibited proliferation in A549 cell lines significantly, Interstingly it was observed that GHA showed weak cytotoxic effects in MRC5 cell lines as a normal cells.

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Effects of Lead Deposition on the Musculoskeletal System

In this treatise we examine lead deposition and its effects on the musculoskeletal system. The population remains at risk of lead exposure due to its continued use, persistence in the environment, and the release of lead from skeletal repositories back into the body's soft tissues. Virtually all organ systems evaluated have proven susceptible to lead toxicity.

Despite these findings, the skeleton was thought to be exempt from lead toxicity until very recently. Accumulating evidence shows that the musculoskeletal system is, in fact, susceptible to lead toxicity even at very low levels (5µg/dL). Lead-sensitive musculoskeletal components include: motor skills, bone growth and development, dentition, fracture healing, bone density, and joint maintenance. This organ system also seems to be vulnerable starting in utero through old age. Continued research in this area will identify novel strategies that may be used in the prevention and treatment of musculoskeletal disorders due to lead exposure.

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Index of Opportunity for Natural Selection for Total Koplik Population and its Surroundings and also for its Autochthonous Tribes

The study is done in Koplik municipality. Koplik is a small town, in the north of Albania. It is built a database for 20000 inhabitans of Koplik Municipality, where it is included the year of birth, the year of marriage and the year of death. These datas, are used to built the genealogical tree and also for 3016 women who actually are alive, is observed the number of children ever born, the number of children dead before the age 15, and those who have survived. Using these datas, total selection index is calculated. This parameter for the entire population included in the study, is low (0.236), but its' value shows that natural selection affects the genetical constitution of Koplik's population. Index due to fertility (0.297) affects more that index due to mortality (0.0217). Also for the autochthonous tribes of Koplik is observed that the index due to fertility affects more than index due to mortality. This effect, is due to the improvement of living conditions and medical care. That affects the decrease of mortality contribution in evolution mechanisms, due to natural selection. The index due to mortality for the autochthonous tribes is lower compared to the entire population (where autochthonous and immigrant tribes are included). The index due to fertility at the autochthonous tribes is presented higher than the population average, also the total selection index is higher for autochthonous tribes (varies from 0.3 to 0.44). So, the total selection index for total population is low, while for autochthonous tribes of Koplik is moderate, that mean,that natyral selection play an important role in genetical constitution of autochthonous population.

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The Spatial and Temporal Regulation of PI(4,5)P2 Is Critical for Symmetry Breaking in Cell Division and Migration

Signaling and cytoskeletal components localize asymmetrically in polarized cells. We monitored polarity reversals of migrating Dictyostelium discoideum cells using a novel microfluidic device. We found that "backness" and "frontness" in regions of the cell were regulated by plasma membrane (PM) PI(4,5)P2 levels. PI 3′Kinase (PI3K) and Phospholipase C (PLC) activity reduce PI(4,5)P2 levels at the front, while high PI(4,5)P2 levels contribute to "backness". The tumor suppressor PTEN catalyses the dephosphorylation of the 3′phosphate of PI(3,4,5)P3, producing PI(4,5)P2. PTEN contains a PI(4,5)P2 binding motif and helps maintain high PI(4,5)P2 levels at the back of the cell in a positive feedback loop. Interestingly, the activity of the GTPase Ras was reciprocally regulated with local PI(4,5)P2 levels during polarity reestablishment, suggesting that high PI(4,5)P2 levels inhibit Ras activity, supporting a negative feedback loop.

PI(4,5)P2 was similarly regulated during cytokinesis. PM PI(4,5)P2 levels rise uniformly as cells round up at metaphase and subsequently concentrate in the furrow. Stimulating metaphase PTEN null cells with chemoattractant gives a transient PI(3,4,5)P3 and F-actin response. We suggest that PI(4,5)P2 levels are upregulated at metaphase and contribute to the rounding up of the cell. Similarly, PI 4′ and 5′ Kinases help terminate uniform chemoattractant-induced responses and contribute to the "backness" of migrating cells. While adaptation occurs at several levels of the signaling cascade, the rise of PI(4,5)P2 levels by several enzymes appears to be the critical factor leading to inhibition in the Local Excitation, Global Inhibition model we have proposed regulates directed migration.

Morphological changes in eukaryotic cells are largely controlled by the regulation of local PI(4,5)P2 and PI(3,4,5)P3 levels, however PI(3,4,5)P3 is not critical. We propose that PM phosphoinositides influence actin assembly, primarily by localizing factors specific to the activity of Rho GTPases. Actin/microfilament assembly (largely mediated by RhoA and Formin activity) is regulated at the back, or in the division furrow, while branching actin/microfilament polymerization (mostly mediated by Rac, Cdc42, and Arp2/3) occurs at the front or the poles, respectively, of a migrating or dividing cell.

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Drosophila *Expansion* Gene Controls Trachea Tube Size

Tubes with distinct shapes and sizes are critical for the proper function of many tubular organs including human lung, kidney and vasculature. Defects in tube-size regulation lead to various human diseases, such as polycystic kidney disease. Here we describe a unique phenotype caused by the loss of a novel, evolutionarily-conserved, *Drosophila* Smad-like protein, Expansion. In *expansion* mutants, unicellular and intracellular tracheal branches develop bubble-like cysts with enlarged apical membranes. Cysts in unicellular tubes are enlargements of the apical lumen, whereas cysts in intracellular tubes are cytoplasmic vacuoles. The cyst phenotype in *expansion* mutants is similar to, but weaker than, that observed in double mutants of *Drosophila* type III receptor tyrosine phosphatases (RPTPs), Ptp4E and Ptp10D. Ptp4E and Ptp10D negatively regulate the receptor tyrosine kinase (RTK) pathways, especially epithelial growth factor receptor (EGFR) and fibroblast growth factor receptor/breathless (FGFR, Btl) signaling to maintain the proper size of unicellular and intracellular tubes. We show Exp genetically interacts with RTK signaling, the downstream targets of RPTPs. Cyst size and number in *expansion* mutants is enhanced by increased RTK signaling and suppressed by reduced RTK signaling. Genetic interaction studies strongly suggest that Exp negatively regulates RTK (EGFR, Btl) signaling to ensure proper tube sizes. Smad proteins generally function as intermediate components of the transforming growth factor-β (TGF-β, DPP) signaling pathway. However, no obvious genetic interaction between *expansion* and TGF-β (DPP) signaling was observed. Therefore, Expansion does not function as a typical Smad protein. The *expansion* phenotype demonstrates a novel role for Smad-like proteins in epithelial tube formation.

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Phytoremediation of VOCs: Improvement of Indoor Air Quality by Potted Plants

Air quality in homes, offices and other indoor spaces has become a major health concern, particularly in developed countries where people often spend about 90% of their time in indoor environment. Surprisingly, indoor air has been reported to be as much as ten times more polluted than outdoor air in some area. Air-borne contaminants such as volatile organic compounds (VOCs) are found in indoor air, and exposure to the VOCs caused human health illness like asthma, nausea, chronic diseases including cancer, neurologic, respiratory and reproductive developmental disorders. Potted plants associated with microorganisms can remove VOCs effectively in the indoor environment, and thus they represent an attractive low-cost, environmental-friendly potential solution for improving indoor air quality and at the same time refresh the mind of people as well as lead to improve human health. The aim of this review is to provide an overview of potential indoor VOC removal system by potted plants. Here we demonstrated the mechanism of VOC removal by potted plants as well as the factors responsible for maximizing the VOC removal rate and efficiency. Finally the article concludes with suggestions for future research to ensure sustainability of the indoor environment, satisfying the social and economical considerations. Using of potted plants could be expected to become a promising environmental-friendly technology for improving indoor air quality.

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Potential Mutagenic Activity of Leachate from a Municipal Solid Waste Landfill on Two Higher Plants

The massive storage of active and closed municipal solid waste into landfills undergoes physical, chemical and biological decomposition, generating leachate and biogas. Raw leachate can cause local and far distant toxins accumulation, acute and chronic impact, ultimately reducing biodiversity and populations of sensitive species. The purpose of the present study was to assess and compare the potential mutagenic activity of leachate collected in a municipal solid waste landfill (localized in the North-West part of Albania) by the means of two higher plant bioassays: *Allium cepa* L. and *Vicia faba* L. 5, 15, 30 and 60% concentrations of raw leachate were used to establish the full-scale phyto- and genotoxicity test on onion bulbs and faba seeds. Endpoints as: root length (MRL) and 50% toxic effective concentration (EC_{50}), mitotic index (MI), frequencies of micronuclei (MNC), chromosomal aberrations (FAC) and types (CA) in root meristem, were evaluated and compared. Raw leachate was highly genotoxic and mutagenic to both onion and broad bean roots. All screened endpoints obviously changed in a dose-dependent manner. Leachate significantly induced delay and reduction of growth and mitotic activity, and increases of micronucleus and chromosomal aberration frequencies along with the concentration increasing. Data of genotoxicity tests marked increases of physiological (sticky, vagrant and laggard chromosomes, c-mitosis, multipolar anaphases and stars) and clastogenic (bridges and fragments) CA types in root meristematic cells of both bioassays. The results also revealed that both applied *A. cepa* and *V. faba* tests are appropriate and efficient in ecotoxicological and monitoring studies of landfill leachate.

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Optimizing Enzyme Behaviour through Protein Engineering

Galactooligosaccharides (GOS) constitute an important class of prebiotic compounds used by the food industry as active ingredients with potential health benefits. GOS are enzymatically produced from lactose using β-galactosidases, through a reaction known as transgalactosylation. Many studies have been conducted in an attempt to increase GOS yields by controlling the reaction conditions using β-galactosidases from a range of microorganisms. In the present study, we have used a high-throughput protein engineering approach to enhance the trangalactosylation activity (thus improve GOS synthesis) of a GOS producing β-galactosidase, BbgIII, from a gut isolated *Bifidobacterium bifidum*. A total of 36 N- and C-terminus deletion mutants were designed. The mutant constructs ranged from highly active to completely inactive enzymes. Selected constructs were tested for their transgalactosylation activity. An up to 50% increase (of total carbohydrates) was obtained with the mutant enzymes. Additionally, up to 2-fold increase in the higher degree of polymerization of GOS products was observed for selected mutants compared to the native enzyme. Structure determination of three highly active constructs at 1.9 Å resolution indicated that truncations affected the oligomeric state of the enzyme, which may have implications for activity. Point mutations of twelve amino acids, most likely involved in the catalytic mechanism, has revealed their relative importance in enzyme activation.

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Physiological Feedback and Tolerance of *Vicia Faba* L. to Cadmium and Zinc and Their Interactions

The uncontrolled discharge of various wastes has tremendously increased the environmental contamination by heavy metals. Being accumulated in sediments, water, soil and ultimately in biota through food chains, they represent an important eco-toxicological and generally biological concern. As heavy-metal-polluted ecosystems usually contain several mixtures and amounts of their compounds, plants are exposed to respective interactions, which have shown to cause additive, synergistic or antagonist adverse effects. The physiological feedback of plants exposed to essential and non-essential metals excess includes alterations in a wide spectrum of physiological features, as: water absorption and metal translocation through the plant, content of photosynthetic pigments and photosynthesis functioning, growth and biomass production. *Vicia faba* has long been used as a model system, providing a standardized method in evaluating the induced-phytotoxicity from both inorganic and organic contaminants. The present study was aimed to assess the physiological responses and tolerance of *V. faba* seeds and seedlings to different experimental concentrations of $CdCl_2$ and $ZnSO_4$ salts and their mixtures. Seed germination capacity, root length and mitotic activity, fresh and dry weights of root and shoot, photosynthetic pigments content and tolerance indexes, were evaluated and compared. The results demostrated metal and mixture dose-dependence of all screened endpoints, suggesting mostly the following phytotoxicity range: Cd+Zn>Cd>Zn on faba seedlings. Root appeared to be less tolerant than shoot against both heavy metals. The findings should serve as an indicator and alert of potential risk that biota and human health may incur by natural and anthropogenic discharge of heavy metals into the environment.

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Germination and Seedling Emergence Studies in Nyala Tree (Xanthocercis Zambesiaca Baker)

The most effective method of breaking *Xanthocercis zambesiaca* seed dormancy was evaluated between December 2013 and January 2014, seedling emergence from October-November 2014 at the Botswana College of Agriculture Plant Physiology laboratory and net-shade, respectively. Completely randomized designs (CRD) were used with five main pre-sowing treatments (untreated seeds-control, cold water, mechanical scarification, hot water and chemical scarification using sulphuric acid) for experiment one and five growth media treatments (sand, clay, garden soil, commercial compost and mixture) for experiment two, each treatment was replicated four times for both experiments. Percentage germination, germination mean time (GMT), germination index (GRI) and percentage emergence were calculated and the data was subjected to analysis of variance (ANOVA). The germination of *X. zambesica* seeds was significantly ($p<0.01$) increased by mechanical scarification and hot water at 5 minutes after 9 days compared to the control and the rest of the treatments. Germination increased for 21 days across all the treatments and in terms of absolute numbers the control was superior after 21 days. However, a non-significant treatment effect was observed for the control, mechanical scarification, cold water and hot water at 5 minutes. GMT and GRI were significantly ($p<0.01$) higher in the control followed by hot water at 5 minutes, mechanical scarification, cold water and sulphuric acid at 5 minutes compared to other treatments. Furthermore, commercial compost significantly ($p<0.01$) increased seedlings emergence 25 days after sowing (DAS) to 39 DAS (32.50-72.50%). The results of the present study shows that germination of X. *zambesiaca* seeds is not hindered by dormancy therefore, the seeds should not be treated for breaking seed dormancy instead enhancing or speeding up germination can be done by mechanical scarifying the seeds, soak seeds in boiling water for 5

minutes and also soaking the seeds in sulphuric acid for 5 minutes. Commercial compost proved to be the best growth medium for *X. zambesiaca* seedling emergence.

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The Effect of Plant Growth Promoting Rhizobacteria (PGPR) and Zinc Fertilizer on the Yield and Agronomic Traits of Maize under Water Deficit Stress Condition

This study was carried out to evaluate the effects of water deficit stress, application of PGPR and zinc fertilizer on the yield and agronomic traits of maize (S.C 704) in the Mahvelat region of Iran in 2009. The experiment was conducted as a split- factorial design with 3 replications. The main plots consisted of three irrigation intervals (6, 9 and 12 days). The sub-plots were six different treatments, including grain inoculation with *Pseudomonas fluorescens* strain169 (T_1), grain inoculation with *P. fluorescens* and zinc sulfate fertilizer (T_2), grain inoculation with *Pseudomonas putida* strain 108 (T_3), grain inoculation with *P. putida* and zinc sulfate fertilizer (T_4), application of zinc sulfate fertilizer (T_5) and control (T_6). The results indicated that sever water deficit stress (12 days) reduced relative water content (RWC), number of grain per ear, number of grain per row, 1000-grain weight, cob weight, grain yield, biological yield and harvest index by 10.62, 55.37, 50, 4.24, 56.18, 57.32, 43.96 and 23.61% respectively, in comparison to normal irrigation (6 days). The bacterial inoculation with PGPR increased RWC, ear leaf area, number of grain per ear, number of grain per row, 1000-grain weight, cob weights, grain and biological yield by 6.6, 12.84, 8.56, 9.74, 5.39, 40.61, 14.72 and 12.35% respectively, as compared to treatment of no application bacterial. Supplying 50 $kg.ha^{-1}$ zinc sulphate fertilizer enhanced ear leaf area, number of grain per ear, number of grain per row, 1000-grain weight, cob weights, grain and biological yield and harvest index by 11.58, 6.58, 5.17, 3.83, 16.95, 10.19, 6.84 and 3.2 % respectively, in comparison to treatment of no application zinc fertilizer. Generally, the result of this study revealed that the most economical yield were obtained in co-application of bacterial inoculation and using 50 $kg.ha^{-1}$ zinc sulfate fertilizer treatment under normal irrigation. Supplying zinc sulphate fertilizer induced water deficit stress tolerance in maize. Hence, bacterial inoculation of seeds by *P. fluorescens* strain 169 or *P. putida* strain108, and using zinc sulphate fertilizer (based on the soil test samples) are recommended for maize cultivation in semi-arid and arid regions.

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Agronomic and Economic Evaluation of Saffron and Wheat Crop Production Systems in Torbat-e-heydarieh, Iran

The goal of this study was to evaluate saffron and wheat production systems in view of energy balance and economic criteria in Torbat-e-Heydarieh, Iran. Data and information was collected by using a face to face questionnaire with farmers cultivating saffron and wheat in 2013. The results revealed that total energy input was 21580 MJ ha^{-1} for saffron and 32061 MJ ha^{-1} for wheat production. In the saffron system the highest energy usage belonged to corm (59.7 %), nitrogen fertiliser (13.8%) and manure (13.4%). In wheat these inputs related to nitrogen fertiliser (25.9%), electricity (18.6%) and fuel (16.1%). Renewable energy made up 26.2% and 80.0%, while non-renewable energy accounted for 26.2% and 20.0% in wheat and saffron systems, respectively. Energy use efficiency was 2.13 and 2.63 in saffron and wheat, respectively. In saffron production system, renewable energy inputs were 10.28 times higher than in wheat production system. Since the main non-renewable input was diesel, electricity and chemical fertilisers, management and improvement of application of machinery, consumption of irrigation water and plant nutrients by renewable resources would increase the share of renewable energy. Benefit to cost ratio was 2.78 and 2.13 in saffron and wheat. Overall, in view of sustainability saffron was a healthier system than wheat and in terms of economical indices it was an efficient production system. Under these conditions improving timing, quantity and consistency of water use, increasing efficiency of water pumping systems, employment of improved machinery management technique, utilisation of substitute sources of energy such as manure and organic fertilisers or integrating legume crops into the rotation may be options to increase the energy use efficiency and to reduce environmental contamination.

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Advancing Graduate Education and Faculty Development with Discipline Based Education Research and the SIMPLE Framework: Creation and Implementation of Innovative and Engaging Teaching Strategies in a Biology Department

SIMPLE is a design framework for faculty development (NSF-1347675). Discipline Based Education Research (DBER) is a form of education research that is STEM discipline specific and sometimes interdisciplinary (NRC, 2012). In a Pilot SIMPLE activity at Mason this past year, the author engaged 5 SIMPLE GTAs and 5 Biology faculty members in the Biology Department. Currently, two GTAs have drafts of DBER papers created with faculty assistance and the other 2 SIMPLE GTAs have designed projects that are underway, including a major development of a bioinformatics curriculum for the department. This work is an unexpected outcome of the NSF WIDER SIMPLE project, which focuses on faculty involvement, and is allowing for the development of a formalized GTA experience that is affordable for universities to sustain. This result shows there is strong interest in Mason's GTA STEM graduate student body for the DBER and SIMPLE activities, and the DBER and SIMPLE activities will transfer to learning experiences for undergraduates, with these outcomes already transferring to faculty at Rutgers University where the SIMPLE model is being studied for use in the Physics Dept. The SIMPLE framework and DBER coursework is intersecting with the preparation of undergraduate Learning Assistants (LAs) (Approximately 150 Learning Assistants are trained at Mason each year; a similar number is trained at Rutgers each year). These LAs are raising student achievement at Mason, including the reduction of students receiving Ds and Fs in a core biology course. We have named the GTAs participating in DBER and SIMPLE to be DS-GTAs: we predict that being a DS-GTA will be associated with improved hiring outcomes for recent STEM Ph.D. recipients seeking an academic career, and that the DS-GTA program will greatly improve the learning and amount of engagement that happens in STEM laboratory sections and courses taught by GTAs.

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Intercropping of Two Medicinal Plants (Ajowan and Cumin), an Approach to Sustainable Agriculture

As human population increase, the pressure is on agriculture to increase production, resulting in soil erosion, loss of biodiversity, urbanization and lack of alternative opportunities in rural areas. Sustainable agriculture involves production methods that provide healthy food for people, conserve biodiversity and is environmentally non-degrading, economically viable and socially acceptable. Intercropping is a production system commonly in some tropic developing countries that can be used to against risk and environmental extremes and improve soil quality and use of resources. As a result of drought, cultivation of some locally adapted medicinal plants has been considered in the east of Iran. Cumin (*Cuminum cyminum*) and ajowan (*Carum copticum*) are two important medicinal plants that could be sown at the autumn. At the early stage, the growth rates of these plants are too slowly to covering enough the soil surface preventing erosion. Intercropping of these plants could reduce soil erosion at the early stages. On the other hand, after cumin harvesting, a plant with short growth season, ajowan would have enough space and resource to complete its long growth period. In order to evaluate the effect of seeding rate and ratio in intercropping of cumin and ajowan, an experiment was conducted at the Agricultural Research Center of Birjand branch, Islamic Azad University, Birjand, Iran in 2011-2012 growing season. Experimental design was a split plot based on randomized complete block with three replications. Three seeding rates (20, 40 and 60 $Kg.ha^{-1}$) and five seeding ratio from cumin (C) and ajowan (A) (100% C, 75% C+25% A, 50% C+50% A, 25% C+75% A and 100% A) were as main plot and sub plot, respectively. The result showed that intercropping increased all profitability indices (such as land equivalent ratio, area time equivalent ratio, intercropping advantage, economic advantage index and relative land equivalent ratio). On the other hand, increasing plant density improved profitability indices. This means that under high plant density, intercropping reduced inter-specific compared to intra-specific competition. The effect of seeding rate and ratio on seed essential oil percent was not significant. Totally, treatment 60 $Kg.ha^{-1}$ and 75% C+25% A had the highest seed yield.

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The Expression Pattern of Mirna-590-3P In Epithelial Ovarian Cancer is a Potential Biomarker for Ovarian Cancer Patients

The epithelial ovarian cancer (EOC) is the most common type of ovarian tumors. The biomarkers, which are being used for EOC screening, have low specificity and sensitivity leading to the late diagnosis and high mortality rate. Thus, identification of effective biomarkers for early diagnosis of ovarian cancer has become a high priority in research. This study aims to address this problem by studying the expression of various acknowledged biomarkers and a potential molecular marker, miRNA-590-3P, in EOC tissue samples collected from Egyptian patients. We examined the expression of miRNA-590-3P in the Egyptian EOC tissue samples, using real-time PCR. We, also, examined the expression of Cancer antigen (CA- 125) which is being used for EOC screening and we studied the correlation between the C-reactive protein (CRP) and the stage of the disease, as well as, the expression of PAX-2, which was found to be associated with low-grade ovarian tumors. CA-125 and CRP were elevated in about 80% of the EOC tissue samples, and, the RNA steady-state levels of these biomarkers were lower in the patients subjected to platinum based combination chemotherapy. The elevated levels of CRP were associated with the late stages of EOC. Moreover, the expression of miRNA-590-3P showed to be likely down regulated in the EOC tissue samples. This suggests that the expression of miRNA-590-3P has a potential role in the prognosis of EOC in Egyptian patients.

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Floral Biology of Female and Hermaphrodite Plants from Mexican Native Papaya

Although Mexico is the origin of *Carica papaya* L., at present, the genotype Maradol, from Cuba, is the variety most commercially used for consumption. The usage of native types such as "Cera amarilla", "Coco", and "Mamey" has drastically decreased and it is limited to the local or regional market. The biological diversity of these native types, regarding the characteristics of leaves, fruits and flowers is unknown. Therefore, the objective of this study was to characterize *ex situ* flowers of female (F) and hermaphrodite (HP) plants from 20 native papaya accessions. Accessions were collected at 18°10'-24°07'north latitude, 90°29'-110°18' west longitude, and 37-1025 mamsl. Twelve centimeter-seedling were transplanted in the field at 1.5 m between plants and 2.0 m between rows using a completely randomized design with five replications per accession. Twenty five inflorescences per accession were label and quantitative and qualitative variables such as numbers of flowers per inflorescence, length of main axis, length of corolla, color of axis, and color of corolla were measured. The HP plants had higher average of number of flowers per inflorescence (9), length of main axis (8.2 cm), and length of corolla (3.9 cm) than the female plants whose values were 4, 2.9 cm and 3.6 cm respectively. White, cream, yellow, and green flowers were observed. White flowers were the most abundant on both types of plants. The HP plants presented the highest value of white flowers (73.7%) while female plants had the highest values of cream (32.0%) and yellow (19.2%) flowers. Only female plants showed green flowers (1.3%). All accessions had inflorescences with green axis. A floral diversity was observed among the 20 native papaya accessions. These quantitative and qualitative characteristics of flowers could be useful to select genotypes for future genetic improvement papaya programs in México.

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Genomic Diversity and Domestication of Soybean

Domestication is a multi-faceted process that is amenable to study by a wide range of disciplines, including archaeology, anthropology, molecular genetics, and evolutionary biology. Domesticated soybean (*Glycine max* (L.) Merr.) and its wild progenitor, *G. soja* exhibit substantial morphological difference in growth habits, seed-coat color, seed size and so on. Our genealogical analyses of 420 *G. max* and *G. soja* accessions indicated cultivated soybean tended to form a monophyletic clade with respect to *G. soja* and the primary division of genetic diversity was between the wild and domesticated accessions. To elucidate the consequences of artificial selection accompanying the domestication of soybean, we analyzed 55 whole-genome re-sequencing accessions as well as seven representative *de novo* sequencing *G. soja* accessions. We found that artificial selection during domestication led to pronounced reduction in the genetic diversity of soybean. Inter-genomic comparisons identified 1,978 genes with copy number variation, 338 genes with *G. soja*-specific presence-absence variation, 2,094 genes affected by artificial selection during domestication for preferred agricultural traits. Comparison of candidate domestication-related genes with previous QTLs, as well as their homologs, we found some genes may contribute to variation of agronomic traits such as pathogen resistance, seed composition, flowering and maturity time, organ size and final biomass. Accordingly, our study of soybean domestication has yielded fundamental insights into the genes and biological mechanisms that underlie morphological change, and the strength and patterns of selection. The results will facilitate the harnessing of untapped genetic diversity from wild soybean for enhancement of elite cultivars.

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The Pleiotropic Preventive Effects of Curcumin in Diabetes Mellitus; The Insights into Attenuation of Postprandial Hyperglycemia and Downstream Molecular Events

Curcumin, the chief constituent of turmeric plant (Curcuma longa), offers remarkable prospects for the preventive treatment of diabetic complications. This plant-derived compound attenuates the postprandial hyperglycemia through the inhibition of two carbohydrate-hydrolyzing enzymes, α-amylase (α-Amy) and α-glucosidase (α-Gls). Additionally, curcumin stimulates the pancreatic cells for production and secretion of insulin, and attenuates activity of at least four major hyperglycemia-associated downstream pathways, participating in the pathogenesis of diabetic complications. The specific molecular targets of curcumin in the pathway of advanced glycation end product (AGE) formation, in the expression of AGE receptor (RAGE), and in aldose reductase and protein kinase C (PKC) pathways highlight the correlation between the protective function and potential therapeutic value of this important phytochemical compound in diabetes mellitus. Moreover, the prominent antioxidant and anti inflammatory properties of curcumin are important to prevent the hyperglycemia associated tissue injuries. In the current study, different curcumin derivatives were synthesized and their anti-diabetic potentials examined through the assessment of α-Amy/α-Gls inhibition and their antioxidant properties. The curcumin-derived compounds demonstrated promising inhibitory activities against these enzymes and indicated prominent antioxidant activities. Overall, these compounds may offer potentially high benefits to control postprandial hyperglycemia and associated complications in diabetic patients.

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Current Conservation Status of the American Crocodile, *Crocodylus acutus* (Cuvier, 1807), in the National Natural Park Paramillo, at Córdoba-Colombia

Colombia is the second country in the world with the highest biodiversity, yet one that has the largest number of threatened ecosystems and species at risk of disappearing. With regard to large reptiles, Colombia has 25% of the species of crocodiles. *Crocodylus acutus* is included in Appendix I of CITES and is listed under the category "Critically Endangered (CR)" in Colombia. In the Department of Córdoba, most populations have been decimated due to the loss or deterioration of habitats and over-harvesting, which has led to a significant reduction in natural populations, threatening the extinction of many of them. Under this scenario, the populations that still exist in the Department, especially those located in the National Natural Park Paramillo constitute one of the few possibilities for this species to continue to exist, since they are not only sheltered from other sectors which have been exterminated or they are critically endangered, but possibly the best preserved. The main purpose of this work was to generate a baseline that allows us to take actions to improve the conservation status of natural populations of this endangered species. The methodology used to estimate the population parameters was based on the potential for recapture and quantification of absence and presence of individuals, who were previously tagged and released so they could be thoroughly mixed with the source population probability. Finality, whit the history of recaptures and biological data from each animal manipulated, from which the density, population, survival rates and fecundity, and the potential area of original and future distribution under different environmental scenarios were estimated.

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Molecular and Genetic Structure of Polytene Chromosome Banding Pattern in *Drosophila Melanogaster*

"Classic" polytene chromosomes from dipteran insects are extensively used as a model for interphase chromosomes. They allow fine analysis of structural organization and genetic activity of chromatin. The peculiar morphology of polytene chromosomes is formed by the alternating densely packed chromatin of bands and less compact interbands.

In our laboratory the new approaches were developed to mark and identify interband regions at molecular map. P-element insertions could serve as useful "markers". We used available datasets from several recent Drosophila genome-wide mapping and annotation projects, in particular, those from modENCODE project, and compared molecular organization of 32 interband regions which were accurately mapped previously. We demonstrate that in interphase chromosomes of *Drosophila* cell lines, the interband regions are enriched for a specific set of proteins generally characteristic of the "open" chromatin (RNA polymerase II, CHRIZ (CHRO), BEAF-32, dMI-2, GAF, NURF301 and WDS). These regions also display reduced nucleosome density, histone H1 depletion and pronounced enrichment for ORC2, a pre-replication complex component. Based on their specific protein composition, in the chromosomes comprise two types of bands, as well as interbands were identifed. These differ in terms of time of replication and specific types of proteins. The borders and organization of the same band and interband regions are largely identical, irrespective of the cell type studied.

We demonstrate that polytene chromosome interbands contain the 5′ ends of housekeeping genes. As a rule, interbands display "head-to-head" orientation of genes. They are enriched for "broad" class promoters characteristic of housekeeping genes. Two types of bands have been described in chromosomes, early and late-replicating, which differ in many aspects of their protein and genetic content. Comparison of expression patterns of genes mapping to late-replicating dense bands vs genes whose promoter regions map to interbands shows that the former are generally tissue-specific, whereas the latter are represented by ubiquitously active genes. Analysis of RNA-seq data from Celniker group indicates that transcripts from interband-mapping genes are present in most tissues and cell lines studied. With help of a special algorithm described before to computationally process protein localization data generated by the modENCODE project and show that *Drosophila* genome has about 5700 sites that demonstrate all the features shared by the interbands cytologically mapped to date. The borders and organization of the same band and interband regions are largely identical, irrespective of the cell type studied. This demonstrates that the banding pattern is a universal principle of the organization of interphase polytene and non-polytene chromosomes.